

CLEAN VERSION OF ALL CLAIMS

1. A process for copolymerizing ethylene or propylene together or with other olefinically unsaturated compounds, which comprises carrying out the polymerization in the presence of a catalyst system which comprises the following components:

- A) a complex of a transition metal with one or two substituted or unsubstituted 1,3,5-triazacyclohexane ligands or corresponding ligands in which one or more of the ring nitrogen atoms are replaced by phosphorus or arsenic atoms, and
- B) if desired one or more activator compounds.

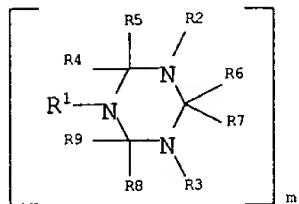
2. A process for copolymerizing ethylene or propylene together or with other olefinically unsaturated compounds at temperatures from 20 to 300°C under pressures from 5 to 4000 bar, which comprises the following steps:

- a) contacting a complex of a transition metal with one or two substituted or unsubstituted 1,3,5-triazacyclohexane ligands (A) with at least one activator compound (B),
- b) contacting the reaction product from step (a) with the olefinically unsaturated compounds under polymerization conditions.

3. (amended) A process as claimed in claim 1, wherein a

~~compound of the formula I~~

X
Sub B30



MXn

I

in which the variables have the following meanings:

M a transition metal of groups 4 to 12 of the periodic table,

R^1-R^9 hydrogen or organosilicon or -carbon substituents with 1 to 30 C atoms, it being possible for two geminal or vicinal R^1 to R^9 radicals also to be connected to form a five- or six-membered ring, and it being possible, when m is 2, for an R^1-R^9 radical of in each case one triazacyclohexane ring to form together with a substituent on the other triazacyclohexane ring a bridge between the two rings,

X fluorine, chlorine, bromine, iodine, hydrogen, C_1-C_{10} -alkyl, C_6-C_{15} -aryl or alkylaryl with 1 to 10 C atoms in the alkyl radical and 6 to 20 C atoms in the aryl radical, trifluoroacetate, BF_4^- , PF_6^- , or bulky noncoordinating anions,

m 1 or 2,

n a number from 1 to 4 which corresponds to the oxidation

*Sub B2
cont.* ~~state of the transition metal M~~

~~is employed as component (A).~~

4. (amended) A process as claimed in claim 1, wherein M is a transition metal of group 6 of the periodic table.

5. (amended) A process as claimed in claim 1, wherein mixtures of ethylene with C₃-C₈- α -olefins are employed as monomers.

6. (amended) A process as claimed in claim 1, wherein an aluminoxane is employed as activator compound (B).

7. (amended) A process as claimed in claim 1, wherein a borane or borate having at least 2 substituted aryl radicals is employed as activator compound (B).

8. (amended) A process as claimed in claim 3, wherein at least one of the radicals R¹, R² and R³ is different from the other radicals in this group.

9. (amended) A catalyst for polymerizing olefins, comprising at least one transition metal complex (A) as defined in claim 1 and a support material and, if desired, one or more activator compounds (B).

10. A process for polymerizing or copolymerizing olefins wherein the polymerization or copolymerization is carried out in the presence of a catalyst as claimed in claim 9.

11. A transition metal complex of the formula I as defined in claim 3, wherein at least one of the radicals R¹, R² and R³ is

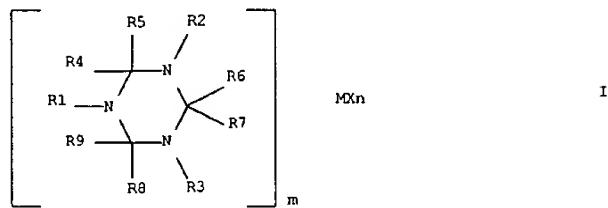
different from the other radicals in this group.

12. A transition metal complex of the formula I as defined in claim 3, wherein m is 2 and one radical R¹-R⁹ of one triazacyclohexane ring together with one of these substituents of the other triazacyclohexane ring forms a bridge between the two rings.

13. (amended) The use of a complex of a transition metal as defined in claim 1 in the copolymerization of ethylene or propylene together or with other olefinically unsaturated compounds.

MARKED-UP VERSION OF AMENDED CLAIMS

3. (amended) A process as claimed in claim 1 [or 2], wherein a compound of the formula I



in which the variables have the following meanings:

M a transition metal of groups 4 to 12 of the periodic table, R¹-R⁹ hydrogen or organosilicon or -carbon substituents with 1 to 30 C atoms, it being possible for two geminal or vicinal R¹ to R⁹ radicals also to be connected to form a five- or six-membered ring, and it being possible, when m is 2, for an R¹-R⁹ radical of in each case one triazacyclohexane ring to form together with a substituent on the other triazacyclohexane ring a bridge between the two rings,

X fluorine, chlorine, bromine, iodine, hydrogen, C₁-C₁₀-alkyl, C₆-C₁₅-aryl or alkylaryl with 1 to 10 C atoms in the alkyl radical and 6 to 20 C atoms in the aryl radical, trifluoroacetate, BF₄⁻, PF₆⁻, or bulky noncoordinating anions,

m 1 or 2,

n a number from 1 to 4 which corresponds to the oxidation state of the transition metal M is employed as component (A).

4. (amended) A process as claimed in [any of claims 1 to 3] claim 1, wherein M is a transition metal of group 6 of the periodic table.

5. (amended) A process as claimed in [any of claims 1 to 4] claim 1, wherein mixtures of ethylene with C₃-C₈- α -olefins are employed as monomers.

6. (amended) A process as claimed in [any of claims 1 to 5] claim 1, wherein an aluminoxane is employed as activator compound (B).

7. (amended) A process as claimed in [any of claims 1 to 5] claim 1, wherein a borane or borate having at least 2 substituted aryl radicals is employed as activator compound (B).

8. (amended) A process as claimed in [any of claims 3 to 7] claim 3, wherein at least one of the radicals R¹, R² and R³ is different from the other radicals in this group.

9. (amended) A catalyst for polymerizing olefins, comprising at least one transition metal complex (A) as defined in [claims 1 to 4, or 8] claim 1 and a support material and, if desired, one or more activator compounds (B).

13. (amended) The use of a complex of a transition metal as

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defined in [any of claims 1 to 4, 11 or 12] claim 1 in the copolymerization of ethylene or propylene together or with other olefinically unsaturated compounds.